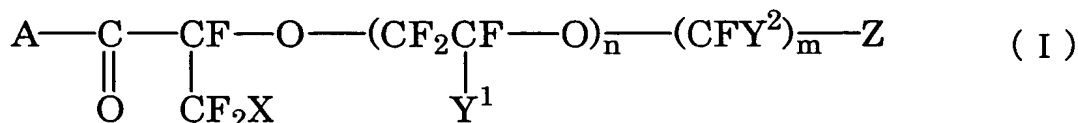


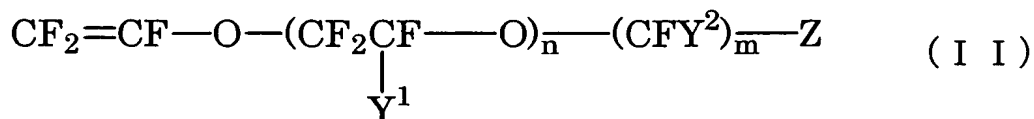
## CLAIMS

1. A method for producing a water-soluble  
fluorine-containing vinyl ether

- 5 which comprises subjecting a fluorine-containing  
2-alkoxypropionic acid derivative represented by the following  
general formula (I):



- 10 (wherein A represents  $-\text{OM}^1$  or  $-\text{OM}^{2}_{1/2}$ , and  $\text{M}^1$  represents an alkali  
metal and  $\text{M}^2$  represents an alkaline earth metal; X represents  
a halogen atom;  $\text{Y}^1$  and  $\text{Y}^2$  are the same or different and each  
represents a fluorine atom, a chlorine atom, a perfluoroalkyl  
15 group or a fluorochloroalkyl group; n represents an integer of  
0 to 3, and n of  $\text{Y}^1$ s may be the same or different; m represents  
an integer of 1 to 5, and m of  $\text{Y}^2$ s may be the same or different;  
and Z represents a hydrophilic group) to thermal decomposition  
at a temperature of not lower than  $50^\circ\text{C}$  but lower than  $170^\circ\text{C}$   
in the presence of a coordinating organic solvent to give a  
20 water-soluble fluorine-containing vinyl ether represented by  
the following general formula (II):



(wherein  $\text{Y}^1$ ,  $\text{Y}^2$ , Z, n and m are as defined above),

- 25 said coordinating organic solvent having a coordinating  
property with an ion of said  $\text{M}^1$  or an ion of said  $\text{M}^2$  and  
said coordinating organic solvent being in an amount of  
10 to 1,000 parts by mass per 100 parts by mass of said  
fluorine-containing 2-alkoxypropionic acid derivative.

2. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1,

wherein the hydrophilic group is  $-\text{COOM}^3$ ,  $-\text{OSO}_3\text{M}^3$ ,  $-\text{SO}_3\text{M}^3$ ,  
 5  $-\text{O}_2\text{PM}^3$ ,  $-\text{OP}(\text{OM}^3)_2$ ,  $-\text{O}_2\text{P}(\text{OM}^3)$ ,  $-\text{OPO}(\text{OM}^3)_2$ ,  $-\text{PO}_2(\text{OM}^3)$ ,  $-\text{PO}(\text{OM}^3)_2$ ,  
 $-\text{COOM}^4_{1/2}$ ,  $-\text{OSO}_3\text{M}^4_{1/2}$ ,  $-\text{SO}_3\text{M}^4_{1/2}$ ,  $-\text{O}_2\text{PM}^4_{1/2}$ ,  $-\text{OP}(\text{OM}^4_{1/2})_2$ ,  
 $-\text{O}_2\text{P}(\text{OM}^4_{1/2})$ ,  $-\text{OPO}(\text{OM}^4_{1/2})_2$ ,  $-\text{PO}_2(\text{OM}^4_{1/2})$ ,  $-\text{PO}(\text{OM}^4_{1/2})_2$ , or a  
 substituted ammonio group forming a salt with a conjugate base  
 of an inorganic acid or fatty acid (its substituents being two  
 10 or three alkyl groups which are the same or different), wherein  
 $\text{M}^3$  represents an alkali metal, a hydrogen atom or  $\text{NR}^1\text{R}^2\text{R}^3\text{R}^4$  in  
 which  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$  and  $\text{R}^4$  are the same or different and each  
 represents a hydrogen atom or an alkyl group containing 1 to  
 4 carbon atoms, and  $\text{M}^4$  represents an alkaline earth metal.

15 3. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1 or 2,  
 wherein the thermal decomposition is carried out at a  
 temperature not lower than  $50^\circ\text{C}$  but lower than  $150^\circ\text{C}$ .

20 4. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2 or 3,  
 wherein the coordinating organic solvent is in an amount  
 of 30 to 300 parts by mass per 100 parts by mass of the  
 25 fluorine-containing 2-alkoxypropionic acid derivative.

5. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2, 3 or  
 4,

30 wherein the coordinating organic solvent comprises an aprotic polar organic solvent.

6. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 5,

35 wherein the aprotic polar organic solvent is an ether

solvent, sulfolane, hexamethylphosphoric triamide, acetonitrile, dimethylformamide, dimethyl sulfoxide, ethyl acetate and/or tetramethylurea.

- 5           7. The method for producing a water-soluble  
fluorine-containing vinyl ether according to Claim 6,  
          wherein the ether solvent is a glyme-based solvent, a  
diethyl ether, a diisopropyl ether, tetrahydrofuran, dioxane,  
anisole and/or a crown ether.

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8. The method for producing a water-soluble  
fluorine-containing vinyl ether according to Claim 7,  
          wherein the glyme-based solvent is dimethoxyethane,  
diethoxyethane, monoethylene glycol dimethyl ether,  
15 diethylene glycol dimethyl ether, triethylene glycol dimethyl  
ether, tetraethylene glycol dimethyl ether, diethylene glycol  
monomethyl ether and/or diethylene glycol monoethyl ether.

9. The method for producing a water-soluble  
20 fluorine-containing vinyl ether according to Claim 5, wherein  
the aprotic polar organic solvent is a glyme-based solvent.

10. The method for producing a water-soluble  
fluorine-containing vinyl ether according to Claim 5, 6, 7, 8  
25 or 9,

          wherein the aprotic polar organic solvent has a water  
content not exceeding 250 ppm.

11. The method for producing a water-soluble  
30 fluorine-containing vinyl ether according to Claim 5,  
          wherein the aprotic polar organic solvent is diethylene  
glycol dimethyl ether.

12. The method for producing a water-soluble  
35 fluorine-containing vinyl ether according to Claim 11,

wherein the diethylene glycol dimethyl ether has a water content not exceeding 250 ppm.

13. The method for producing a water-soluble  
5 fluorine-containing vinyl ether according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12,

wherein the fluorine-containing 2-alkoxypropionic acid derivative represented by the general formula (I) has a water content not exceeding 0.1% by mass.

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14. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13,

wherein n is 0 or 1.

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15. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14,

wherein Z is  $-\text{SO}_3\text{M}^3$  or  $-\text{SO}_3\text{M}^{4}_{1/2}$ .

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16. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15,

25 wherein Z is  $-\text{SO}_3\text{M}^3$ , A is  $-\text{OM}^1$  or  $-\text{OM}^{2}_{1/2}$ ,  $\text{Y}^1$  is a trifluoromethyl group,  $\text{Y}^2$  is a fluorine atom and m is 2.

17. The method for producing a water-soluble fluorine-containing vinyl ether according to Claim 16, wherein n is 0.

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